British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Data and research for environmental applications and models [DREAM]

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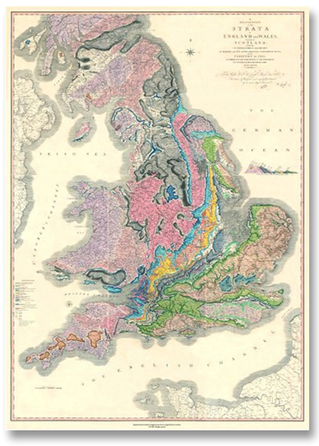
Introduction

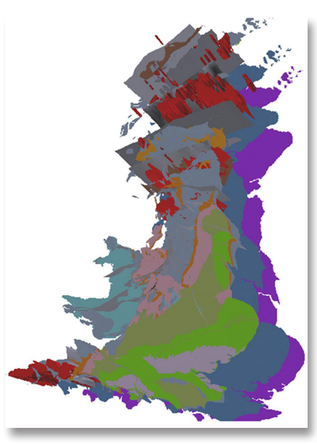
The BGS has a long history of working with regulators, government and industry to aid environmental decision-making and provide geological information for planning guidance, for example supporting sustainable groundwater abstraction or reducing risks from groundwater flooding.

To aid future environmental decision-making BGS has developed a 3D geological modelling capability that enables characterisation and attribution of the shallow subsurface environment.

The Challenge for BGS and collaborators is to integrate these models with future environmental change scenarios and deal with the 'what ifs', incorporating data and models from all relevant environmental sciences. These are the things that determine what will be sustainable underground developments.



From maps



to models

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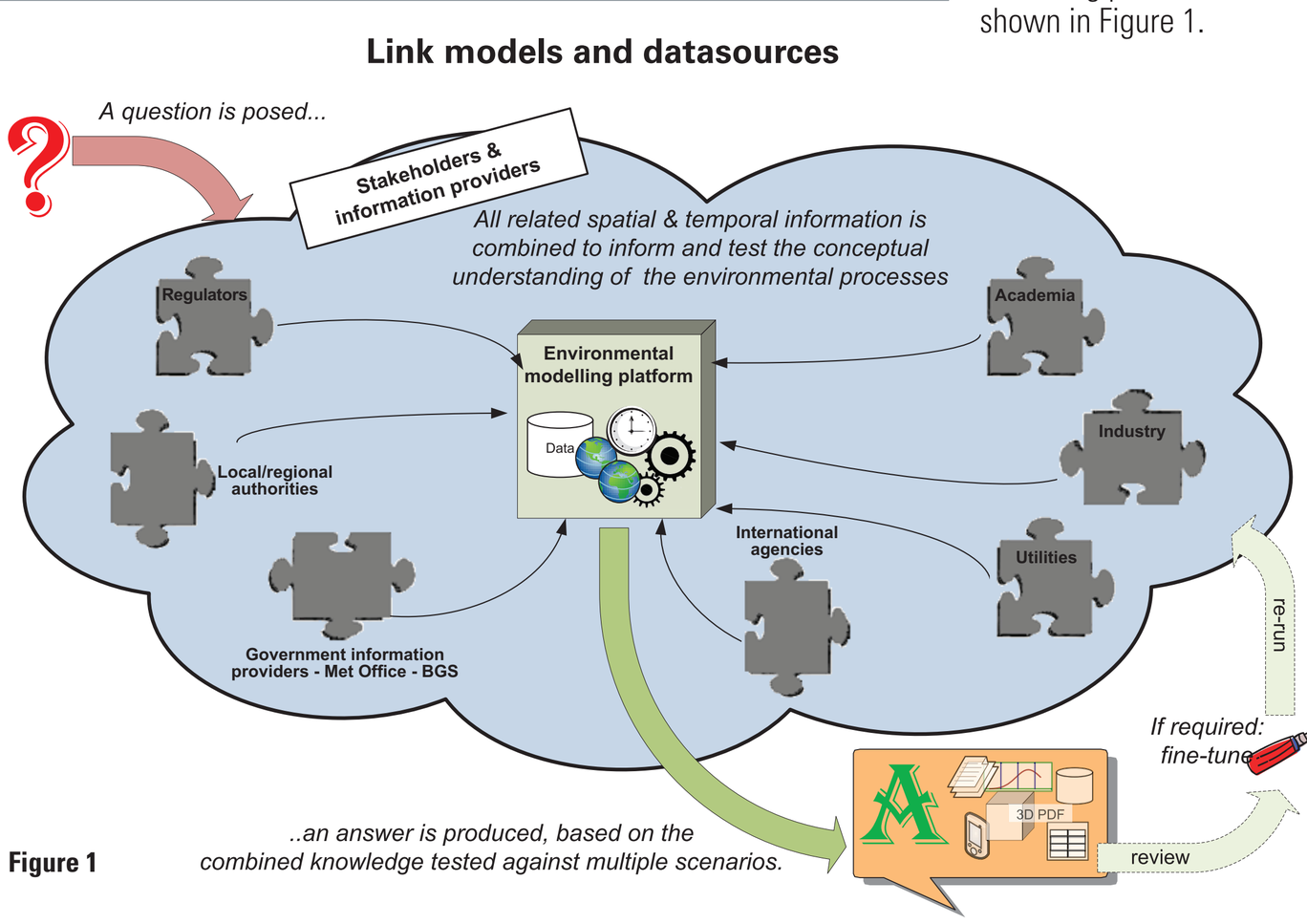
to forecasts

Linking, viewing and sharing environmental knowledge

Our vision is to provide access to data, tools, techniques and support to address transdisciplinary environmental questions impacting on human society.

We aim to achieve this by being a leading member of an open community that will share data, applications and environmental models thus enabling collaboration and achieving sustainable solutions (Giles et al. 2010).



Giles, J R A, Hughes, A, Kessler, H, Watson, C, Peach, D. 2010. Data applications and environmental modelling: scoping study report. Nottingham, UK, British Geological Survey, 75pp. (OR/10/020) http://nora.nerc.ac.uk/10745/

Figure 1

We will develop a toolkit that allows the creation of an environmental modelling platform focussed on solving specific environmental questions as shown in Figure 1.

The toolkit will include:

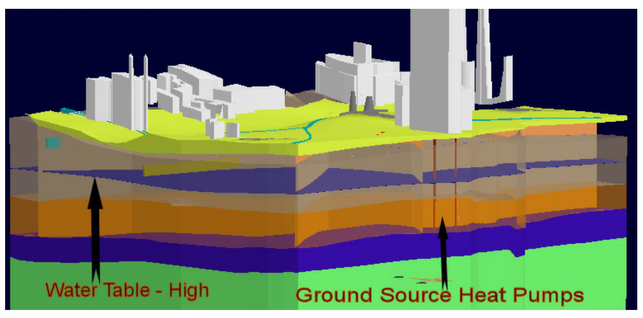
- standards and tools that enable the connection of data sources, 3–4D framework models and process/ numerical models
- access to BGS data
- 4D visualisation software
- open, web based and mobile solutions where possible — therefore reducing the cost and security overheads involved

This will allow users to answer trans-disciplinary questions with an automated system that will:

- plug-in new data
- connect the most relevant models to each other
- configure key parameters
- test multiple scenarios
- clearly define the answer-producing process in an auditable and repeatable workflow by retaining metadata

Visualise many models in 4D

In order to gain a better understanding of the complexity in earth-system modelling we believe it is vital that scientists are able to visualise baseline data, conceptual models and numerical model results in one single viewer.



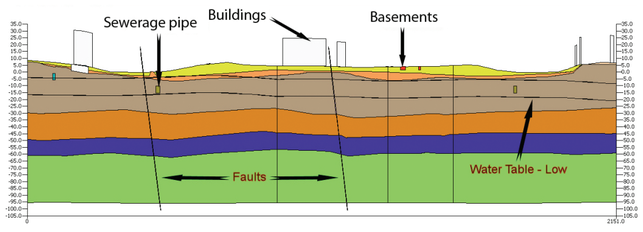
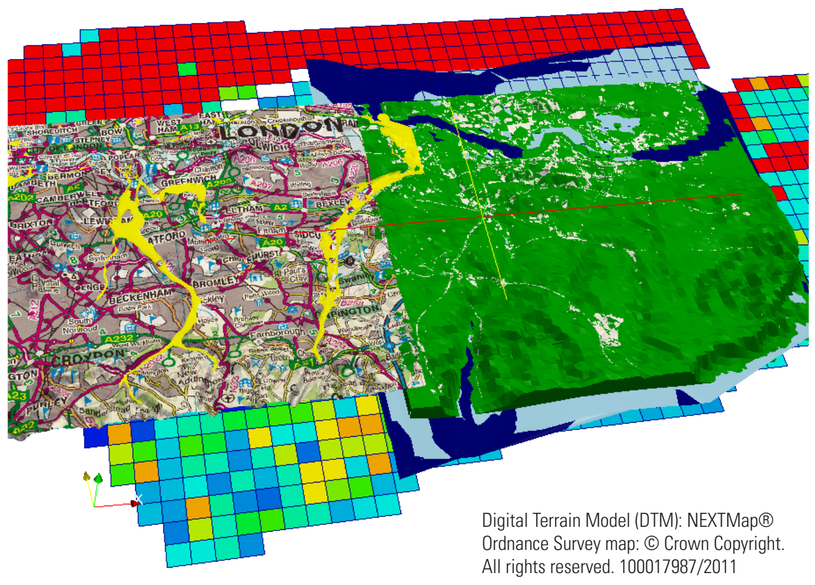
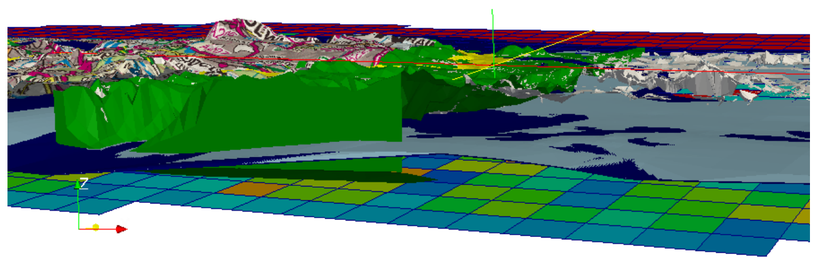


Figure 2 Integration of infrastructure and groundwater models for an area around London Bridge.



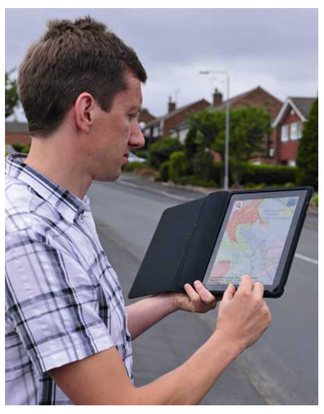
Digital Terrain Model (DTM): NEXTMap® Ordnance Survey map: © Crown Copyright. All rights reserved. 100017987/2011



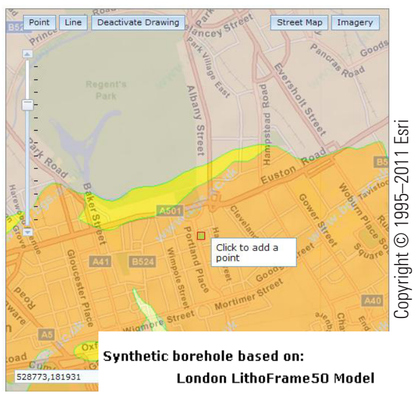
Figures 3 & 4 *(top and above)* Snapshots of a 4D viewer prototype constructed in ParaViewGeo for London containing:

- geological surfaces and shells
- multiple water tables (blue surfaces)
- Temporal recharge rates (gridded colours)

Web and mobile delivery



Finally the DREAM is only realised if and when the model results can be delivered in a way that allows decision-makers to have easy and free access, allowing them to integrate the model results into their own workflows and decision-making processes.



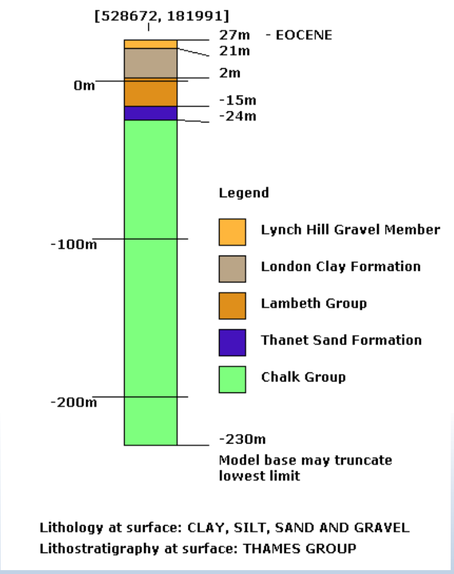


Figure 5 The new synthetic cross-section and borehole viewer that will be available through the web and iGeology mobile app.

Contact information

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